THE UNIVERSITY OF BRITISH COLUMBIA
Curriculum Vitae for Faculty Members

Date: March 21, 2024   **Initials:** SP

1. **SURNAME:** Picard   **FIRST NAME :** Sébastien
   MIDDLE NAME(S): Félix

2. **DEPARTMENT/SCHOOL:** Mathematics

3. **FACULTY:** Science

4. **PRESENT RANK:** Assistant Professor   **SINCE:** July 1, 2020

5. **POST-SECONDARY EDUCATION**

   (a) *Degrees:*

University or Institution	Degree	Subject Area	Dates
Columbia University	Ph.D.	Mathematics	2013–2018
McGill University	M.Sc.	Mathematics	2011–2013
University of Victoria	B.Sc.	Physics and Mathematics	2006–2011

   (b) *The Hull-Strominger system in complex geometry.*
       Ph.D. thesis, Columbia University,
       Supervisor: Prof. D.H. Phong

6. **EMPLOYMENT RECORD**

   (a) *Prior to coming to UBC:*

University, Company or Organization	Rank or Title	Dates
Harvard University	Benjamin Peirce Fellow	2018–2020

   (b) *At UBC:*

Rank or Title	Dates
Assistant Professor	July 2020–Present

   (c) *Date of granting of tenure at UBC:*

7. **LEAVES OF ABSENCE**

8. **TEACHING**

- *Teaching Statement:*
  A good lecturer should spark excitement in the subject and inspire students to explore the course material. I believe it is important to develop an interactive environment where students are encouraged to ask questions. I recommend student collaboration on problem sets, since I believe that discussing the course material with peers is an excellent way to bring poorly understood concepts to light; to encourage this, I typically ask my students to introduce themselves to their neighbour during the first lecture of the semester. I enjoy teaching and sharing my passion and enthusiasm for mathematics.

(a) *Courses taught at UBC:*

Session	Course number	Scheduled hours	Class size	Hours taught			
				Lectures	Tutorials	Labs	Other
2020/21 W1	MATH 104	3	88	3 hrs/wk			
2020/21 W2	MATH 317	3	128	3 hrs/wk			IIC*
2021/22 W1	MATH 449D	1	1	1 hrs/wk			
2021/22 W2	MATH 526	3	6	3 hrs/wk			
2021/22 W2	MATH 317	3	103	3 hrs/wk			IIC*
2022/23 W1	MATH 602D	3	11	3 hrs/wk			
2022/23 W2	MATH 526	3	5	3 hrs/wk			
2022/23 W2	MATH 317	3	56	3 hrs/wk			IIC*
2022/23 W2	MATH 317	3	102	3 hrs/wk			IIC*
2023 S	MATH 253	7	150	7 hrs/wk			
2023/24 W1	MATH 317	3	150	3 hrs/wk			

∗ IIC = Instructor in charge. Responsible for coordinating 2 sections of MATH 317.

(b) *Graduate/undergraduate students supervised and/or co-supervised:*

Student name	Program type	Dates	Principal supervisor	Co-supervisor(s)
Anna Kis	BSc	Summer 2022	SP	
Yucong Sun	MSc	2021–2023	SP	
Peilin Wu	MSc	Jan 2023 –	SP	
Caleb Suan	PhD	2021–	SP	
Benjamin Friedman	PhD	2022–	SP	Ailana Fraser
Roomina Zand	PhD	2023–	SP	Albert Chau

(c) *Student committees and thesis reading:*

Student name	Degree	Role	Department	Date
Su Liang	PhD	Candidacy exam committee	Mathematics	October 2023
Mahsa Rahnama	PhD	Candidacy exam committee	Mathematics	October 2023
Atharva Korde	PhD	Candidacy exam chair	Mathematics	August 2023
Yucong Sun	MSc	MSc thesis examiner	Mathematics	April 2023

Caleb Suan	PhD	Candidacy exam committee	Mathematics	April 2023
Adam Martens	PhD	Candidacy exam committee	Mathematics	December 2022
Patrik Coulibaly	PhD	Candidacy exam committee	Mathematics	September 2022
Manuel Ruivo de Oliveira	PhD	Candidacy exam chair	Mathematics	October 2021
Stephen Pietromonaco	PhD	Candidacy exam chair	Mathematics	October 2021

(d) *Continuing education activities:*

(e) *Visiting lecturer (indicate university/organization and dates):*

(f) *Course development:*

(g) *Employees supervised:*

(h) *Other:* Courses taught at other institutions

- Harvard - Math 281Y: Topics in Non-Kahler Geometry (Spring 2020)
- Harvard - Math 230A: Graduate Differential Geometry (Fall 2019)
- Harvard - Math 136: Differential Geometry of Curves and Surfaces (Fall 2019)
- Harvard - Math 269Y: Topics in Parabolic PDE (Spring 2019)
- Harvard - Math 21B: Linear Algebra (Spring 2019)
- Harvard - Math 136: Differential Geometry of Curves and Surfaces (Fall 2018)
- Columbia - Math UN1101: Calculus I (Fall 2016)
- Columbia - Math UN1201: Calculus III (Summer 2015)

9. **SCHOLARLY AND PROFESSIONAL ACTIVITIES**

- *Research Statement:*
  My field of research is differential geometry and nonlinear partial differential equations. I am particularly interested in equations coming from mathematical physics and complex geometry. Many fundamental equations of theoretical physics, such as the Yang-Mills equation and the Einstein field equations, are formulated as nonlinear differential equations on manifolds and vector bundles. The goal of my research is to advance the analysis of nonlinear equations in differential geometry, with a main focus on equations from theoretical physics.

(a) *Areas of special interest*
  Differential geometry, complex geometry, nonlinear PDE, Calabi-Yau geometry.

(b) *Research or equivalent grants (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC)):*

Granting agency	Subject	COMP	$ per year	Dates	Principal investigator	Co-investigator(s)
NSERC	Mathematics	C	$26,000	2021–2026	SP	–
NSERC	Mathematics	C	$12,500	2021	SP	–

(c) *Research or equivalent contracts (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC)):*

(d) *Invited presentations* (Since 2007):

- Workshop on PDES in Complex Geometry at CRM Montreal (April 2024)
- CMS Winter Meeting 2023 in Montreal (December 2023)
- Workshop on Geometric Flows and Applications at ICMS Edinburgh (July 2023)
- Australia New Zealand Geometry Strings Field seminar (April 2023)
- Simons Center Workshop on Supergravity, Generalized Geometry and Ricci Flow (April 2023)
- University of Toronto Geometry and Topology Seminar (March 2023)
- UBC Undergraduate Mathematics Society Invited Lecture (March 2023)
- Columbia University Complex Geometry Seminar (February 2023)
- Stavanger University Geometry and Physics Seminar (January 2023)
- Canadian Geometry and Topology Seminar at UQAM (November 2022)
- Pacific Northwest Geometry Seminar at Seattle U (November 2022)
- Rutgers Newark Department Colloquium (November 2022)
- Generalized Geometry in Interaction Workshop at ICMAT Madrid (June 2022)
- Geometry and Tacos Online Conference (May 2022)
- Deformation of Geometric Structures in Current Mathematics: A Celebration of the Works of Masatake Kuranishi at Harvard (May 2022)
- Virginia Tech String Theory Group Meeting (March 2022)
- Iowa State Geometric Analysis Seminar (March 2022)
- CUHK Geometric Analysis Seminar (October 2021)
- Columbia Complex Geometry and PDE Seminar (September 2021)
- Geometric Analysis Session at CMS Meeting Ottawa (June 2021)
- McGill Geometry Analysis Seminar (March 2021)
- Differential Geometry Seminar Torino (March 2021)
- KIAS Geometry and Analysis Seminar (December 2020)
- ICMAT Madrid Geometry Seminar (December 2020)
- UC Irvine Differential Geometry Seminar (December 2020)
- McMaster Geometry and Topology Seminar (November 2020)
- McGill Geometric Analysis Seminar (May 2020)
- Brandeis Everytopic Seminar (March 2020)
- UIC Geometry, Topology and Dynamics seminar (February 2020)
- University of Washington Colloquium (January 2020)
- University of British Columbia Differential Geometry Seminar (December 2019)
- University of British Columbia Colloquium (December 2019)
- AdIMOM Conference in Toronto (April 2019)
- Snapshots of Math at Harvard (February 2019)
- Harvard Differential Geometry Seminar (October 2018)
- CIME school on complex non-Kähler geometry (July 2018)
- Boston University Geometry and Physics Seminar (April 2018)

- AMS Sectional Meeting at Ohio State (March 2018)
- U Waterloo Geometry and Topology Seminar (February 2018)
- Fields Geometric Analysis Colloquium (February 2018)
- AMS Sectional Meeting at UC Riverside (November 2017)
- Conference on New Directions in Kähler Geometry at Notre Dame (June 2017)
- UC Irvine Differential Geometry Seminar (May 2017)
- Ohio State PDE Seminar (January 2017)
- Harvard Differential Geometry Seminar (November 2016)
- Syracuse Analysis Seminar (October 2016)
- Northwestern Analysis Seminar (May 2016)

(e) *Conference organization:*
- Co-organizer, program on "The Geometry of Moduli Spaces in String Theory" at MATRIX in Melbourne 2024
- Co-organizer, CRM workshop on "Special Riemannian Geometries in Dimensions 6,7,8" in Montreal 2024
- Co-organizer, special session on "Recent developments in complex geometry and geometric analysis" at CMS 2021 Winter Meeting
- Co-organizer, Geometry and TACoS (Online Conference Series), 2020-2021

(f) *Other:*
- Organizer, UBC Differential Geometry, Mathematical Physics and PDE Seminar 2021-present
- Co-organizer, Harvard Differential Geometry Seminar, 2018-2020
- Co-organizer, Brandeis-Harvard-MIT-Northeastern Joint Mathematics Colloquium, 2018-2020
- Co-organizer, Harvard Open Neighborhood Seminar, 2019-2020
- Co-organizer, Informal Complex Geometry and PDE Seminar at Columbia University 2015-2018

10. **SERVICE TO THE UNIVERSITY**

(a) *Memberships on committees, including offices held and dates*
- Math. Dept. Hiring Committee, 2023-2024
- Math. Dept. Undergraduate Affairs Committee, 2021-2023

(b) *Other service, including dates*

11. **SERVICE TO THE COMMUNITY**

(a) *Memberships on scholarly societies, including offices held and dates*

(b) *Memberships on other societies, including offices held and dates*

(c) *Memberships on scholarly committees, including offices held and dates*
- Member of FRQNT project evaluation committee, 2023-2024

- Member of NSERC Committee 177 - Scholarships and Fellowships Selection Committee for Mathematical Sciences, 2019-2022

(d) *Memberships on other committees, including offices held and dates*

(e) *Editorships (list journal and dates)*

(f) *Reviewer (journal, agency, etc. including dates)* Journals:
- Analysis and PDE (2022)
- Annales Scientifiques de l'Ecole Normale Superieure (2019, 2022)
- Annali della Scuola Normale Superiore di Pisa (2017)
- Canadian Journal of Mathematics (2022)
- Communications in Analysis and Geometry (2021, 2023)
- Compositio Mathematica (2021)
- CUBO Mathematical Journal (2020)
- Geometry and Topology (2019)
- International Journal of Mathematics (2023)
- International Mathematics Research Notices (2018, 2022)
- Journal of Differential Geometry (2019, 2020, 2021, 2022)
- Journal of the European Mathematical Society (2021)
- Journal of Geometric Analysis (2022)
- Journal of the London Mathematical Society (2018)
- Journal of Functional Analysis (2023)
- Journal fur die reine und angewandte Mathematik (2019)
- Nonlinear Analysis (2020)
- Pure and Applied Mathematics Quarterly (2019)
- Proceedings of the AMS (2022)
- Proceedings of the London Mathematical Society (2021)
- Transactions of the AMS (2021)
- Mathematical Research Letters (2019, 2023)
- Mathematische Zeitschrift (2022, 2024)

(g) *External examiner (indicate universities and dates)*

(h) *Consultant (indicate organization and dates)*

(i) *Other service to the community*

12. **<u>AWARDS AND DISTINCTIONS</u>**

(a) *Awards for Teaching (indicate name of award, awarding organizations, date)*
- Certificate of teaching excellence, Harvard University, 2019
- Certificate of teaching excellence, Harvard University, 2018

(b) *Awards for Scholarship (indicate name of award, awarding organizations, date)*

(c) *Awards for Service (indicate name of award, awarding organizations, date)*

(d) *Other Awards*

13. **<u>OTHER RELEVANT INFORMATION</u>** (Maximum One Page)

THE UNIVERSITY OF BRITISH COLUMBIA
Publications Record

Date: March 21, 2024   **Initials:** SP

Surname: Picard   **First Name:** Sébastien
Middle Name(s): Félix

ORCID ID: 0000-0001-9015-8976

Notes:

- In mathematics authors are listed alphabetically.

- All authors are assumed to have made equal contributions to the work, in accordance with the norm of the discipline.

1. REFEREED PUBLICATIONS

(a) Journals

1. T.C. Collins, S. Picard and S.-T. Yau
The Strominger system in the square of a Kahler class
to appear in Pure Appl. Math. Q.

2. S. Picard and C. Suan
Flows of G_2-Structures associated to Calabi-Yau Manifolds
to appear in Math. Res. Lett.

3. T. Fei, D.H. Phong, S. Picard and X.-W. Zhang
Stability of the Type IIA flow and its applications in symplectic geometry
to appear in Communications in Analysis and Geometry.

4. T.C. Collins, S. Gukov, S. Picard and S.-T. Yau
Special Lagrangian cycles and Calabi-Yau transitions
Commun. Math. Phys. 401, 769–802 (2023).

5. T.C. Collins, S. Picard and S.-T. Yau
Stability of the tangent bundle through conifold transitions
Comm. Pure Appl. Math. 77, 284-371 (2024).

6. T. Fei, D.H. Phong, S. Picard and X.-W. Zhang
Bochner-Kodaira formulas and the Type IIA flow
J Geom Anal 33, 48 (2023).

7. S. Picard
Transitions and Fluxes
Mathematical Research Postcards (2022).

8. T.C. Collins and S. Picard
The Dirichlet problem for the k-Hessian equation on a complex manifold
American Journal of Mathematics 144, no. 6 (2022), 1641-1680.

9. T. Fei, D.H. Phong, S. Picard and X.-W. Zhang
Estimates for a geometric flow for the Type IIB string
Math. Ann. 382 (2022), 1935-1955.

10. T. Fei, D.H. Phong, S. Picard and X.-W. Zhang
    Geometric flows for the Type IIA string
    Cambridge Journal of Mathematics, Vol. 9, No. 3 (2021), 683-807.

11. T. Fei and S. Picard
    Anomaly flow and T-duality
    Pure and Applied Mathematics Quarterly, Vol. 17, No. 3 (2021), 1083-1112.

12. D.H. Phong, S. Picard, and X.-W. Zhang
    Fu-Yau Hessian equations
    J. Differential Geom. 118 (2021), No. 1, 147-187.

13. T. Fei, S. Picard and Z. Huang
    The Anomaly flow over Riemann surfaces
    I.M.R.N. 2021, no. 3 (2021), 2134-2165.

14. T. Fei, S. Picard and Z. Huang
    A construction of infinitely many solutions to the Strominger system
    J. Differential Geom. 117 (2021), No. 1, 23-39.

15. D.H. Phong, S. Picard, and X.-W. Zhang
    A flow of conformally balanced metrics with Kähler fixed points
    Math. Ann. 374, no. 3-4 (2019), 2005-2040.

16. D.H. Phong, S. Picard, and X.-W. Zhang
    The Anomaly flow on unimodular Lie groups
    Contemp. Math. (2019), Vol. 735, Advances in Complex Geometry.

17. D.H. Phong, S. Picard, and X.-W. Zhang
    On estimates for the Fu-Yau generalization of a Strominger system
    J. Reine Angew. Math (2019), No. 751, 243-274.

18. D.H. Phong, S. Picard, and X.-W. Zhang
    Anomaly flows
    Comm. Anal. Geom. 26 (2018) No. 4, 955-1008.

19. D.H. Phong, S. Picard, and X.-W. Zhang
    The Anomaly flow and the Fu-Yau equation
    Annals of PDE 4 (2018), No. 2.

20. D.H. Phong, S. Picard, and X.-W. Zhang
    Geometric flows and Strominger systems
    Math. Z. 288 (2018), 101-113.

21. D.H. Phong, S. Picard, and X.-W. Zhang
    New curvature flows in complex geometry
    Surveys in Differential Geometry 22 (2017), No. 1, 331-364.

22. T.C. Collins, S. Picard and X. Wu
    Concavity of the Lagrangian phase operator and applications
    Calc. Var. 56, 89 (2017).

23. D.H. Phong, S. Picard, and X.-W. Zhang
    The Fu-Yau equation with negative slope parameter
    Inventiones mathematicae 209 (2017), No. 2, 541-576.

24. D.H. Phong, S. Picard, and X.-W. Zhang
    A second order estimate for general complex Hessian equations
    Analysis and PDE 9 (2016), No. 7, 1693-1709.

25. S. Picard
   A priori estimates of the degenerate Monge-Ampère equation on Kähler manifolds of non-negative bisectional curvature
   Math. Res. Lett. 20 (2013), No 6, 1145-1156.

(b) Conference Proceedings (Refereed)

   1. S. Picard and X.-W. Zhang
      Parabolic complex Monge-Ampère equations on compact Kähler manifolds
      Proceedings of the International Consortium of Chinese Mathematicians (2018), International Press of Boston.

   2. S. Picard
      Calabi-Yau manifolds with torsion and geometry flows
      In: Angella D., Arosio L., Di Nezza E. (eds) Complex Non-Kähler Geometry (2019). Lecture Notes in Mathematics, vol 2246. Springer, Cham.

   3. D.H. Phong, S. Picard, and X.-W. Zhang
      Supersymmetric string vacua with torsion and geometric flows
      PoS (Proceeding of Science), CORFU2016 (2017) 096.

2. **NON-REFEREED PUBLICATIONS**

   (a) Journals

   (b) Conference Proceedings

   (c) Other

   (d) **BOOKS**

      1. Authored
      2. Edited
      3. Chapters

   (e) **PATENTS**

   (f) **SPECIAL COPYRIGHTS**

   (g) **ARTISTIC WORKS, PERFORMANCES, DESIGNS**

   (h) **OTHER WORKS**

   (i) **WORK SUBMITTED**

      - S. Picard
        The Strominger System and Flows by the Ricci Tensor
        preprint 2024, 44 pages, arXiv:2402.17770.
      - J. McOrist, S. Picard and E.E. Svanes
        A Heterotic Hermitian-Yang-Mills Equivalence
        preprint 2024, 34 pages, arXiv:2402.10354.
      - S. Picard and P.-L. Wu
        Balanced and Aeppli parameters for the Heterotic moduli
        preprint 2024, 35 pages, arXiv:2401.05331.